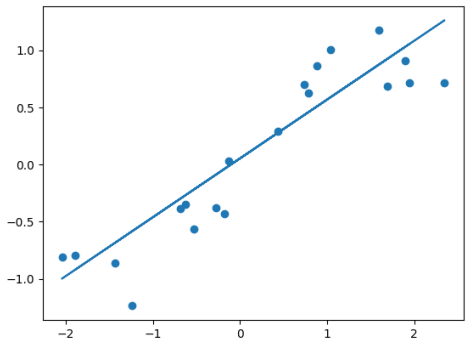
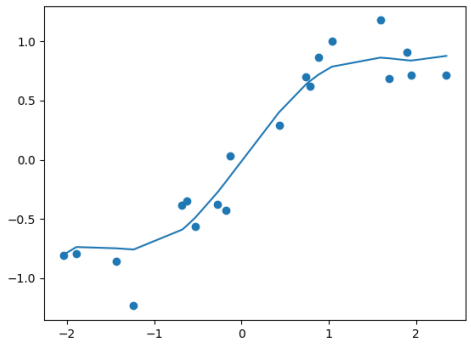
Homework 2 Report:

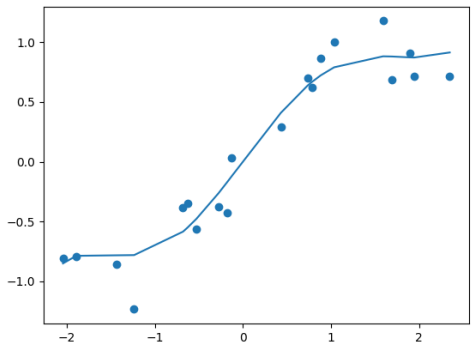
Emir Eryılmaz S025189

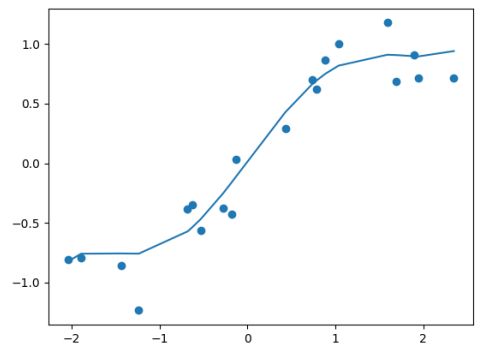
Part A)

My results after convergence for the training data can be seen below. It can easily be observed that the single-layer perceptron (first figure), was not able to fit the training data as well as the multi-layer perceptron models did. When we compare the multi-layer perceptron models among themselves, we can see that the accuracy did not vary too much.

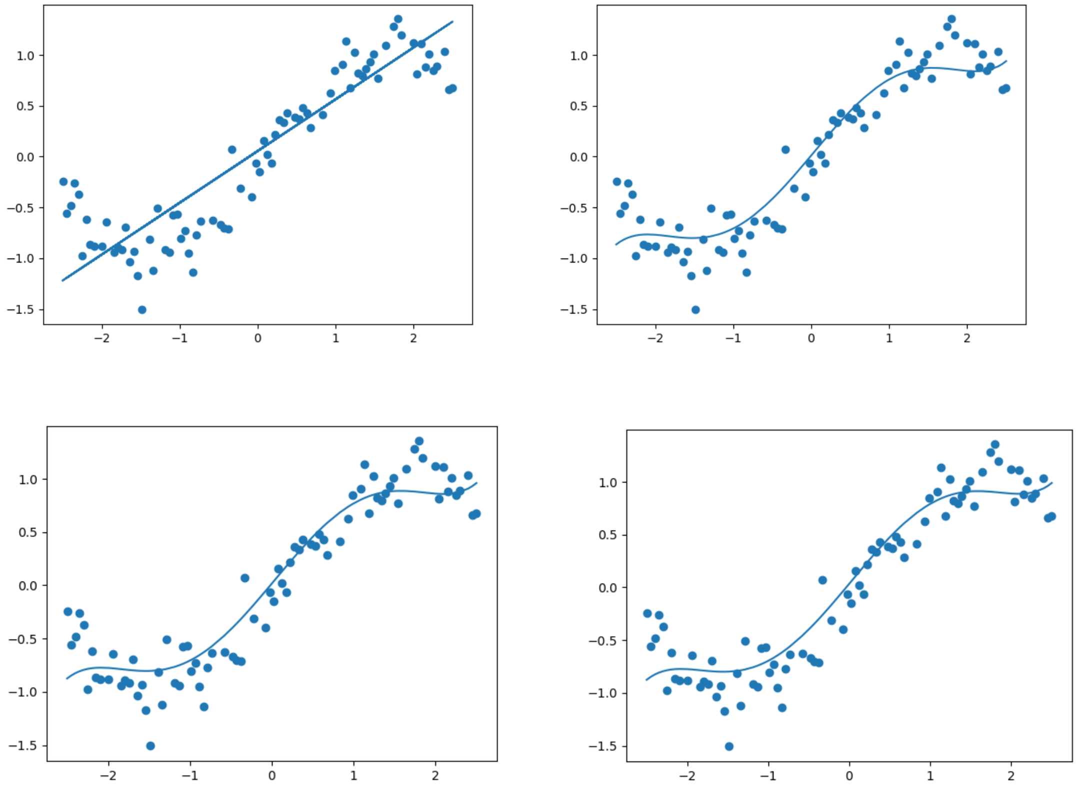








We can see the same plots for the test data below. Even though it is not very obvious, we can observe that the model did a better job in fitting to the training data compared to the test data. Of course, this is expected since we train the model using the training data.



Part B)

Finally, we have the plots for the error versus network complexity. The plots at the top are generated from the training data and the ones in the bottom are generated from the test data. The reason I have 2 plots for each set is that the error of the single-layer perceptron is significantly higher than the error of the multiple-layer perceptron models. Because of this, the errors of the multiple-layer perceptron seem too close on the plots on the left.

As expected, the error on the single-layer perceptron is much higher than the multi-layer perceptrons.

The errors of the multi-layer perceptron varies a lot but usually 20 hidden units perform the best among the three.